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Fully supersymmetric chains

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Author

Message

denis_berthier

Posted: Fri Jun 19, 2009 7:26 am Post subject:



Joined: 19 Jun 2007

Posts: 1085

Location: Paris, France

THE SCOPE OF NRCZT-WHIPS (concrete results)

The computations I mentioned in the previous post are now over. They took 5 weeks.

The 1,000,000 different randomly generated minimal puzzles in the sudogen0_1M collection can all be solved using only nrczt-whips of maximal length 13.

(sudogen0_1M is an extension to 1,000,000 puzzles of the sudogen0 collection of 10,000 puzzles I had used previously. It is generated with the same suexg program).

Although the partial results in the previous post suggested that it'd be the case, I'm very surprised by this result - and I can't explain it.

There is nothing in the suexg generator that could bias it in favour of puzzles solvable by nrczt-whips (the solver it uses to check the intermediate grids is based on a set cover algorithm, very different from the nrczt resolution rules).

I've also checked that all the puzzles in the collection are different and uncorrelated (more on how I did this later).

All this tends to prove that the sudogen0_1M collection is indeed a random sample of the set of all minimal puzzles.

These results also confirmed the strong correlation between the nrczt-rating and the SER : 0.895. (More on correlation between various aspects of a puzzle soon in the "ratings" thread.) Although I've already mentioned this correlation result long ago, it remains very surprising, because these two ratings are based on very different sets of rules.

Here are now the results on the number of puzzles solved at each level of the NRCZT-hierarchy:

Code:

Level	Number	Total
1_0	417,624	417,624
1	120,618	538,242
2	138,371	676,613
3	168,355	844,968
4	123,153	968,121
5	24,187	992,308
6	5,511	997,819
7	1,514	999,333
8	473	999,806
9	130	999,936
10	38	999,974
11	15	999,989
12	9	999,998
13	2	1,000,000

14 0

They confirm that:

- more than 99% of the minimal puzzles can be solved with whips of length 5 or less;
- more than 99.9% of the minimal puzzles can be solved with whips of length 7 or less.

As a side effect of these computations, I've also found a few interesting puzzles that I'll propose here soon.

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denis_berthier

Posted: Mon Jun 22, 2009 8:33 am Post subject:



Joined: 19 Jun 2007

Posts: 1085

Location: Paris, France

A PUZZLE with SER = 9.4 and NRCZT RATING = 17

Although the 1,000,000 puzzles in the sudogen0_1M collection can be solved with whips no longer than 13, there are extremely rare puzzles that need much longer whips.

The first example is #10 in gsf's list of 14 puzzles with backdoor size 3. It has SER = 9.4 and NRCZT = 17.

```
001000200
030000040
500030006
000107000
040000080
000902000
300000008
060050030
002000700
```

***** SudoRules version 13.7wbis *****

```
001000200030000040500030006000107000040000080000902000300000008060050030002000700
singles ==> r5c5 = 6, r1c9 = 3
interaction block b5 with column c5 for number 8 ==> r9c5 <> 8, r2c5 <> 8, r1c5 <> 8
interaction block b5 with column c5 for number 4 ==> r9c5 <> 4, r7c5 <> 4, r1c5 <> 4
interaction block b5 with row r5 for number 5 ==> r5c9 <> 5, r5c7 <> 5, r5c3 <> 5, r5c7 <> 3,
r5c3 <> 3
nrc-chain[3] r8n2{c4 c9} - r5n2{c9 c1} - c2n2{r4 r3} ==> r3c4 <> 2
hidden-single-in-row r3 ==> r3c2 = 2
nrczt-whip[9] r5c7{n1 n9} - r5c3{n9 n7} - c9n7{r5 r2} - r3n7{c8 c4} - r1c5{n7 n9} - r9c5{n9 n1}
- c2n1{r9 r7} - c8n1{r7 r3} - b3n9{r3c8 .} ==> r6c9 <> 1
nrczt-whip[10] b8n7{r8c4 r7c5} - c2n7{r7 r6} - c8n7{r6 r3} - c9n7{r2 r5} - r5n2{c9 c1} -
b4n1{r5c1 r6c1} - b6n1{r6c8 r5c7} - b3n1{r3c7 r2c9} - r8n1{c9 c6} - c5n1{r9 .} ==> r1c4 <> 7
nrczt-whip[10] r5c7{n1 n9} - r5c3{n9 n7} - r5c9{n7 n2} - r8n2{c9 c4} - r8n7{c4 c1} - c2n7{r7
r1} - r1c5{n7 n9} - r1c8{n9 n5} - r2c7{n5 n8} - r3c7{n8 .} ==> r6c7 <> 1
nrczt-whip[12] r9c5{n1 n9} - r1c5{n9 n7} - r7c5{n7 n2} - c5n1{r7 r2} - r2n2{c5 c4} - r8n2{c4
c9} - c9n1{r8 r5} - r5c7{n1 n9} - b9n9{r8c7 r7c8} - c8n1{r7 r3} - b3n9{r3c8 r2c9} - b3n7{r2c9
.} ==> r9c6 <> 1
nrczt-whip[13] r5c7{n1 n9} - r5c3{n9 n7} - r5c9{n7 n2} - r8n2{c9 c4} - r8n7{c4 c1} - c2n7{r7
r1} - r1c5{n7 n9} - r1c8{n9 n5} - r4c8{n5 n6} - r9c8{n6 n9} - r3n9{c8 c3} - c1n9{r2 r4} -
r4n2{c1 .} ==> r6c8 <> 1
interaction row r6 with block b4 ==> r5c1 <> 1
nrczt-whip[9] c8n1{r7 r3} - c9n1{r2 r5} - r5c7{n1 n9} - r5c3{n9 n7} - r3n7{c3 c4} - r8n7{c4 c1}
- r2n7{c1 c9} - b3n9{r2c9 r1c8} - r1c5{n9 .} ==> r8c7 <> 1, r7c7 <> 1
nrczt-whip[13] r8c7{n4 n9} - r5c7{n9 n1} - r3c7{n1 n8} - r3c4{n8 n7} - r1c5{n7 n9} - r9c5{n9
n1} - r8c6{n1 n8} - r8c3{n8 n7} - r5c3{n7 n9} - r3n9{c3 c8} - r2n9{c9 c1} - r2n7{c1 c9} -
```

$b3n1\{r2c9.\} ==> r8c4 <> 4$
 $nrczt-whip[16] r5n2\{c1 c9\} - b9n2\{r8c9 r7c8\} - b8n2\{r7c5 r8c4\} - r8n7\{c4 c3\} - c2n7\{r7 r1\} - r1c5\{n7 n9\} - r9c5\{n9 n1\} - c8n1\{r9 r3\} - r7n1\{c8 c2\} - r8n1\{c1 c9\} - r5n1\{c9 c7\} - r5n9\{c7 c3\} - c2n9\{r4 r9\} - c1n9\{r9 r2\} - r3n9\{c3 c7\} - b9n9\{r8c7.\} ==> r5c1 <> 7$
 $nrczt-whip[16] r8n2\{c9 c4\} - r7n2\{c5 c8\} - r4n2\{c8 c1\} - r5c1\{n2 n9\} - r5c3\{n9 n7\} - r8n7\{c3 c1\} - c2n7\{r7 r1\} - r1c5\{n7 n9\} - r9c5\{n9 n1\} - c8n1\{r9 r3\} - b9n1\{r7c8 r8c9\} - b7n1\{r8c1 r7c2\} - c2n9\{r7 r9\} - c8n9\{r9 r4\} - c9n9\{r5 r2\} - b3n7\{r2c9.\} ==> r5c9 <> 2$
 $hidden-single-in-row r5 ==> r5c1 = 2$
 $nrczt-whip[17] r5c3\{n7 n9\} - r5c7\{n9 n1\} - r5c9\{n1 n7\} - c8n7\{r6 r1\} - r1c5\{n7 n9\} - r1c2\{n9 n8\} - r4c2\{n8 n5\} - b7n5\{r9c2 r7c3\} - c3n4\{r7 r8\} - r8c7\{n4 n9\} - r3c7\{n9 n8\} - r3c4\{n8 n4\} - r3c6\{n4 n1\} - r8c6\{n1 n8\} - c4n8\{r9 r2\} - r2n7\{c4 c5\} - r2n2\{c5.\} ==> r3c3 <> 7$
 $nrczt-whip[4] c8n1\{r7 r3\} - r3n7\{c8 c4\} - r1c5\{n7 n9\} - r9c5\{n9.\} ==> r9c9 <> 1$
 $nrczt-whip[9] r9c5\{n1 n9\} - r1c5\{n9 n7\} - r3n7\{c4 c8\} - c8n1\{r3 r7\} - c5n1\{r7 r2\} - r3n1\{c6 c7\} - r5c7\{n1 n9\} - b9n9\{r8c7 r8c9\} - b9n2\{r8c9.\} ==> r9c2 <> 1$
 $nrczt-whip[8] r8c7\{n4 n9\} - r9c9\{n9 n5\} - r6c9\{n5 n7\} - b4n7\{r6c3 r5c3\} - r8c3\{n7 n8\} - r8c6\{n8 n1\} - r9c5\{n1 n9\} - r9c2\{n9.\} ==> r8c9 <> 4$
 $nrczt-whip[9] r8n2\{c9 c4\} - r7n2\{c5 c8\} - b9n1\{r7c8 r9c8\} - r9c5\{n1 n9\} - r1c5\{n9 n7\} - b8n7\{r7c5 r7c4\} - c2n7\{r7 r6\} - c2n1\{r6 r7\} - r7c5\{n1.\} ==> r8c9 <> 9$
 $nrczt-whip[8] r9c5\{n1 n9\} - r1c5\{n9 n7\} - r3n7\{c4 c8\} - c8n1\{r3 r7\} - r8n1\{c9 c6\} - r3n1\{c6 c7\} - r5c7\{n1 n9\} - b9n9\{r7c7.\} ==> r9c1 <> 1$
 $nrczt-whip[7] b7n1\{r8c1 r7c2\} - c5n1\{r7 r2\} - c5n2\{r2 r7\} - c5n7\{r7 r1\} - c2n7\{r1 r6\} - b6n7\{r6c9 r5c9\} - c9n1\{r5.\} ==> r8c6 <> 1$
 $nrczt-whip[7] r8n1\{c1 c9\} - c8n1\{r9 r3\} - r3n7\{c8 c4\} - r8n7\{c4 c3\} - r5c3\{n7 n9\} - c2n9\{r4 r1\} - r1c5\{n9.\} ==> r8c1 <> 9$
 $nrczt-whip[8] b4n9\{r4c1 r5c3\} - r8n9\{c3 c6\} - r3n9\{c6 c8\} - r7n9\{c8 c2\} - c2n1\{r7 r6\} - c2n7\{r6 r1\} - c8n7\{r1 r6\} - b4n7\{r6c3.\} ==> r4c7 <> 9$
 $nrczt-whip[9] r4n2\{c8 c9\} - r8c9\{n2 n1\} - b7n1\{r8c1 r7c2\} - c8n1\{r7 r3\} - r3n7\{c8 c4\} - r1c5\{n7 n9\} - c2n9\{r1 r9\} - c9n9\{r9 r2\} - c1n9\{r2.\} ==> r4c8 <> 9$
 $nrct-chain[5] r5c3\{n7 n9\} - r4n9\{c1 c9\} - c9n2\{r4 r8\} - r8n1\{c9 c1\} - c2n1\{r7 r6\} ==> r6c2 <> 7$
 $nrct-chain[3] c2n7\{r1 r7\} - b8n7\{r7c4 r8c4\} - r3n7\{c4 c8\} ==> r1c8 <> 7$
 $nrct-chain[4] c1n1\{r8 r6\} - c2n1\{r6 r7\} - c2n7\{r7 r1\} - c1n7\{r2 r8\} ==> r8c1 <> 8, r8c1 <> 4$
 $nrc-chain[6] r1c8\{n5 n9\} - r1c5\{n9 n7\} - c2n7\{r1 r7\} - b7n1\{r7c2 r8c1\} - r8c9\{n1 n2\} - c8n2\{r7 r4\} ==> r4c8 <> 5$
 $nrct-chain[8] r3n7\{c8 c4\} - c5n7\{r1 r7\} - c2n7\{r7 r1\} - r2n7\{c3 c9\} - b6n7\{r5c9 r6c8\} - c1n7\{r6 r8\} - r8n1\{c1 c9\} - c8n1\{r9 r3\} ==> r3c8 <> 9$
 $nrczt-whip[7] c8n9\{r7 r1\} - r1c5\{n9 n7\} - c2n7\{r1 r7\} - c2n9\{r7 r4\} - c1n9\{r4 r2\} - c1n7\{r2 r6\} - r5c3\{n7.\} ==> r9c9 <> 9$
 $xyt-chain[5] r9c9\{n5 n4\} - r8c7\{n4 n9\} - r5c7\{n9 n1\} - r3c7\{n1 n8\} - r2c7\{n8 n5\} ==> r7c7 <> 5, r2c9 <> 5$
 $nrczt-whip[8] b9n2\{r7c8 r8c9\} - b9n1\{r8c9 r9c8\} - r9c5\{n1 n9\} - c8n9\{r9 r1\} - r1c5\{n9 n7\} - r1c2\{n7 n8\} - r9c2\{n8 n5\} - b9n5\{r9c9.\} ==> r7c8 <> 6$
 $nrczt-whip[8] c2n1\{r6 r7\} - r8n1\{c1 c9\} - b9n2\{r8c9 r7c8\} - r7n5\{c8 c3\} - r9c2\{n5 n9\} - r1c2\{n9 n7\} - r1c5\{n7 n9\} - c8n9\{r1.\} ==> r6c2 <> 8$
 $nrczt-whip[9] c2n7\{r7 r1\} - r1c5\{n7 n9\} - r9c5\{n9 n1\} - r7n1\{c6 c8\} - r8n1\{c9 c1\} - c1n7\{r8 r6\} - r5c3\{n7 n9\} - c2n9\{r4 r9\} - c8n9\{r9.\} ==> r7c2 <> 5$
 $nrc-chain[4] r7n5\{c3 c8\} - r1c8\{n5 n9\} - r1c5\{n9 n7\} - c2n7\{r1 r7\} ==> r7c3 <> 7$
 $nrczt-whip[6] r7n5\{c3 c8\} - b3n5\{r1c8 r2c7\} - c7n8\{r2 r3\} - r3c3\{n8 n4\} - b7n4\{r8c3 r9c1\} - r9c9\{n4.\} ==> r7c3 <> 9$
 $nrczt-whip[6] c7n8\{r3 r2\} - b3n5\{r2c7 r1c8\} - r7n5\{c8 c3\} - c3n4\{r7 r8\} - r8c7\{n4 n9\} - c8n9\{r9.\} ==> r3c3 <> 8$
 $nrczt-whip[7] b9n2\{r7c8 r8c9\} - b9n1\{r8c9 r9c8\} - r9c5\{n1 n9\} - r1c5\{n9 n7\} - c2n7\{r1 r7\} - r7n9\{c2 c7\} - b9n6\{r7c7.\} ==> r7c8 <> 5$
 $hidden-single-in-row r7 ==> r7c3 = 5$
 $nrc-chain[4] b4n5\{r4c2 r6c2\} - c2n1\{r6 r7\} - r8n1\{c1 c9\} - c9n2\{r8 r4\} ==> r4c9 <> 5$
 $nrczt-whip[5] r1c5\{n9 n7\} - r1c2\{n7 n8\} - r9c2\{n8 n9\} - c8n9\{r9 r7\} - r8n9\{c7.\} ==> r1c6 <> 9$
 $nrczt-whip[5] r5c7\{n1 n9\} - r8c7\{n9 n4\} - c3n4\{r8 r3\} - r3n9\{c3 c6\} - r3n1\{c6.\} ==> r2c7 <> 1$
 $nrct-chain[6] b7n4\{r9c1 r8c3\} - r8c7\{n4 n9\} - c8n9\{r7 r1\} - r1c5\{n9 n7\} - r1c2\{n7 n8\} - r9c2\{n8$

```

n9} ==> r9c1 <> 9
nrczt-whip[6] r8c7{n9 n4} - c3n4{r8 r3} - r3n9{c3 c6} - b8n9{r9c6 r9c5} - r9n1{c5 c8} -
b9n6{r9c8 .} ==> r7c7 <> 9
nrczt-whip[6] r8c7{n9 n4} - c3n4{r8 r3} - r3n9{c3 c6} - r1c5{n9 n7} - r3c4{n7 n8} - c7n8{r3 .}
==> r2c7 <> 9
xyt-chain[4] r2c7{n8 n5} - r1c8{n5 n9} - r1c5{n9 n7} - r1c2{n7 n8} ==> r2c3 <> 8, r2c1 <> 8
interaction block b1 with row r1 for number 8 ==> r1c6 <> 8, r1c4 <> 8
nrczt-whip[6] r1n8{c1 c2} - r9c2{n8 n9} - c8n9{r9 r7} - b9n2{r7c8 r8c9} - b9n1{r8c9 r9c8} -
r9c5{n1 .} ==> r1c1 <> 9
nrczt-whip[6] r5c3{n7 n9} - c1n9{r4 r2} - r2c9{n9 n1} - r3n1{c8 c6} - b2n9{r3c6 r1c5} - r1n7{c5
.} ==> r2c3 <> 7
nrczt-whip[6] r2c3{n6 n9} - r2c1{n9 n7} - r2c9{n7 n1} - r3n1{c8 c6} - b2n9{r3c6 r1c5} - r1n7{c5
.} ==> r1c1 <> 6
interaction row r1 with block b2 for number 6 ==> r2c6 <> 6, r2c4 <> 6
nrct-chain[6] r8c7{n4 n9} - c8n9{r9 r1} - r1c5{n9 n7} - r1c2{n7 n8} - r1c1{n8 n4} - b7n4{r9c1
r8c3} ==> r8c6 <> 4
nrct-chain[4] r2c7{n8 n5} - r1c8{n5 n9} - b9n9{r9c8 r8c7} - r8c6{n9 n8} ==> r2c6 <> 8
nrczt-whip[4] r9n3{c4 c6} - r9n6{c6 c8} - r7c7{n6 n4} - b8n4{r7c4 .} ==> r9c4 <> 8, r9c6 <> 8
interaction row r9 with block b7 for number 8 ==> r8c3 <> 8
interaction column c3 with block b4 for number 8 ==> r6c1 <> 8, r4c2 <> 8, r4c1 <> 8
hidden-pairs-in-a-block b4{r4c3 r6c3}{n3 n8} ==> r6c3 <> 7, r6c3 <> 6, r4c3 <> 9, r4c3 <> 6
hidden-single-in-column c3 ==> r2c3 = 6
hidden-pairs-in-a-column c1{n4 n8}{r1 r9} ==> r1c1 <> 7
nrc-chain[4] r8c9{n2 n1} - c1n1{r8 r6} - c1n6{r6 r4} - r4c8{n6 n2} ==> r7c8 <> 2
singles ==> r8c9 = 2, r4c8 = 2, r8c1 = 1, r6c2 = 1, r4c2 = 5
interaction block b9 with column c8 for number 1 ==> r3c8 <> 1
naked-single ==> r3c8 = 7
nrc-chain[3] r3c4{n8 n4} - c3n4{r3 r8} - r8n7{c3 c4} ==> r8c4 <> 8
singles
GRID 10 SOLVED. LEVEL = NRCZT17, MOST COMPLEX RULE = NRCZT17
481675293
736829541
529431876
953187624
247563189
618942357
375296418
164758932
892314765

```

Last edited by denis_berthier on Tue Dec 15, 2009 5:45 am; edited 1 time in total

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denis_berthier

Posted: Mon Jun 22, 2009 8:41 am Post subject:



Joined: 19 Jun 2007

Posts: 1085

Location: Paris, France

A PUZZLE with SER = 9.3 and NRCZT = 21

The second example has SER 9.3 and NRCZT = 21.

It is #5287 in gsf's list of 8152 hardest.

***** SudoRules version 13.7wbis *****

```

100000000040602000008000500090300020000070900000209060500000001060004090007000008
interaction column c9 with block b3 for number 6 ==> r1c7 <> 6
hidden-pairs-in-a-block {n4 n9}{r7c3 r9c1} ==> r9c1 <> 3, r9c1 <> 2, r7c3 <> 3, r7c3 <> 2
nrczt-whip-bn[5] n6{r1c3 r3c1} - n6{r3c9 r1c9} - n2{r1c9 r3c9} - n9{r3c9 r2c9} - {n9r2c3 .}
==> r1c3 <> 2
nrczt-whip-rn[5] n6{r3c9 r1c9} - n2{r1c9 r8c9} - n2{r8c3 r5c3} - n2{r5c1 r3c1} - {n6r3c1 .}
==> r3c9 <> 9

```

nrct-chain[4] n6{r1c3 r3c1} - n6{r3c9 r1c9} - n9{r1c9 r2c9} - n9{r2c3 r1c3} ==> r1c3 <> 5, r1c3 <> 3

nrczt-whip-rn[5] n6{r3c9 r1c9} - n2{r1c9 r8c9} - n2{r8c3 r5c3} - n2{r5c1 r3c1} - {n6r3c1 .} ==> r3c9 <> 7, r3c9 <> 4, r3c9 <> 3

nrczt-whip-rn[6] n2{r8c3 r5c3} - n2{r5c1 r3c1} - n2{r3c9 r1c9} - n9{r1c9 r2c9} - n9{r2c3 r1c3} - {n6r1c3 .} ==> r8c7 <> 2, r8c5 <> 2

nrczt-whip-rn[6] n2{r5c3 r8c3} - n2{r8c1 r3c1} - n2{r3c9 r1c9} - n9{r1c9 r2c9} - n9{r2c3 r1c3} - {n6r1c3 .} ==> r5c2 <> 2

nrczt-whip-cn[6] n9{r2c9 r1c9} - n9{r1c3 r3c1} - n6{r3c1 r3c9} - n2{r3c9 r8c9} - n2{r8c3 r5c3} - {n2r5c1 .} ==> r2c5 <> 9

nrczt-whip-rc[11] {n3 n7}r8c7 - {n7 n4}r7c8 - {n4 n5}r9c8 - {n5 n2}r8c9 - n2{r8c3 r5c3} - n2{r5c1 r3c1} - n2{r3c9 r1c7} - n4{r1c7 r1c9} - n9{r1c9 r2c9} - n9{r7c3 r1c3} - {n9r7c3 .} ==> r9c7 <> 3

nrczt-whip-rc[11] {n7 n3}r8c7 - {n3 n4}r7c8 - {n4 n5}r9c8 - {n5 n2}r8c9 - n2{r8c3 r5c3} - n2{r5c1 r3c1} - n2{r3c9 r1c7} - n4{r1c7 r1c9} - n9{r1c9 r2c9} - n9{r7c3 r1c3} - {n9r7c3 .} ==> r7c7 <> 7

nrczt-whip-rc[11] {n3 n7}r8c7 - {n7 n4}r7c8 - {n4 n5}r9c8 - {n5 n2}r8c9 - n2{r8c3 r5c3} - n2{r5c1 r3c1} - n2{r3c9 r1c7} - n4{r1c7 r1c9} - n9{r1c9 r2c9} - n9{r7c3 r1c3} - {n9r7c3 .} ==> r7c7 <> 3

nrczt-whip-rc[5] n4{r4c9 r1c9} - n6{r1c9 r3c9} - n2{r3c9 r8c9} - {n2 n6}r9c7 - {n6r7c7 .} ==> r4c7 <> 4, r6c7 <> 4

hidden-triplets-in-a-column {n2 n4 n6}{r7 r1 r9}c7 ==> r1c7 <> 8, r1c7 <> 7, r1c7 <> 3

nrczt-whip[21] n2{r5c3 r5c1} - n6{r5c1 r3c1} - {n6 n2}r3c9 - n2{r8c9 r8c3} - n1{r8c3 r9c2} - n2{r9c2 r1c2} - n5{r1c2 r2c3} - n3{r2c3 r6c3} - n1{r6c3 r4c3} - n4{r4c3 r7c3} - {n4 n9}r9c1 - {n9 n5}r9c4 - n5{r9c8 r5c8} - {n5 n8}r5c2 - n8{r7c2 r8c1} - n3{r8c1 r2c1} - n3{r2c7 r8c7} - {n3 n1}r8c5 - {n1 n8}r2c5 - n8{r6c5 r6c7} - {n1r6c7 .} ==> r5c3 <> 6

nrczt-whip-rn[18] n2{r7c5 r9c5} - n6{r9c5 r4c5} - n6{r4c3 r1c3} - n9{r1c3 r2c3} - n9{r2c9 r1c9} - n6{r1c9 r3c9} - n2{r3c9 r8c9} - n5{r8c9 r9c8} - {n5 n1}r9c4 - {n1 n3}r9c2 - n2{r9c2 r7c2} - n2{r3c2 r3c1} - n3{r3c1 r2c1} - {n3 n7}r2c9 - n7{r3c8 r7c8} - n7{r8c9 r8c4} - n5{r8c4 r8c5} - {n5r2c5 .} ==> r7c5 <> 9

nrczt-whip-bn[17] n9{r7c3 r7c4} - n9{r3c4 r3c5} - n9{r1c5 r1c9} - n6{r1c9 r3c9} - n2{r3c9 r8c9} - n5{r8c9 r9c8} - {n5 n1}r9c4 - n1{r9c2 r8c3} - n2{r8c3 r5c3} - n3{r5c3 r6c3} - n5{r6c3 r4c3} - n5{r2c3 r2c5} - n5{r9c5 r8c4} - n7{r8c4 r8c7} - n3{r8c7 r2c7} - {n3 n7}r2c9 - {n7r6c9 .} ==> r2c3 <> 9

nrc-chain[5] {n4 n2}r1c7 - {n2 n6}r3c9 - n6{r1c9 r1c3} - n9{r1c3 r7c3} - {n9 n4}r9c1 ==> r9c7 <> 4

nrct-chain[7] {n4 n2}r1c7 - n2{r9c7 r8c9} - n2{r8c3 r5c3} - n2{r5c1 r3c1} - n6{r3c1 r1c3} - n9{r1c3 r2c1} - n9{r2c9 r1c9} ==> r1c9 <> 4

interaction column c9 with block b6 for number 4 ==> r5c8 <> 4

nrczt-whip-cn[7] n6{r3c1 r3c9} - n6{r1c9 r1c3} - n9{r1c3 r2c1} - n9{r2c9 r1c9} - n2{r1c9 r8c9} - n2{r8c3 r5c3} - {n2r5c1 .} ==> r3c1 <> 7, r3c1 <> 3

nrczt-whip-cn[7] n6{r1c9 r1c3} - n6{r3c1 r3c9} - n2{r3c9 r8c9} - n2{r8c3 r5c3} - n2{r5c1 r3c1} - n9{r3c1 r2c1} - {n9r2c9 .} ==> r1c9 <> 3

jellyfish-in-columns n3{r8 r6 r5 r2}{c1 c9 c3 c7} ==> r8c5 <> 3, r6c2 <> 3, r5c8 <> 3, r5c2 <> 3, r2c8 <> 3, r2c5 <> 3

nrczt-whip-cn[7] n6{r1c9 r1c3} - n6{r3c1 r3c9} - n2{r3c9 r8c9} - n2{r8c3 r5c3} - n2{r5c1 r3c1} - n9{r3c1 r2c1} - {n9r2c9 .} ==> r1c9 <> 7

nrczt-whip-rn[11] n2{r5c3 r8c3} - n1{r8c3 r9c2} - {n1 n8}r5c2 - n5{r5c2 r1c2} - n5{r2c3 r2c5} - n5{r6c5 r4c6} - n5{r4c9 r6c9} - {n5 n1}r5c8 - n1{r5c6 r3c6} - {n5 n1}r8c4 - {n5r8c4 .} ==> r5c3 <> 5

nrczt-whip-rn[13] n2{r9c5 r7c5} - n6{r7c5 r4c5} - n6{r4c3 r1c3} - n9{r1c3 r7c3} - {n9 n4}r9c1 - {n4 n3}r9c8 - n5{r9c8 r5c8} - n5{r6c9 r8c9} - n2{r8c9 r9c7} - {n2 n1}r9c2 - {n1 n8}r5c2 - {n8 n3}r7c2 - {n3r8c3 .} ==> r9c5 <> 5

nrczt-whip-cn[14] n2{r7c5 r9c5} - n6{r9c5 r4c5} - n6{r4c3 r1c3} - n6{r3c1 r5c1} - n2{r5c1 r5c3} - n3{r5c3 r5c9} - n4{r5c9 r5c4} - n8{r5c4 r1c4} - n8{r8c4 r8c1} - n2{r8c1 r8c9} - {n2 n9}r1c9 - n9{r1c5 r3c5} - n4{r3c5 r1c5} - {n3r1c5 .} ==> r7c5 <> 8

nrczt-whip-rn[14] n4{r9c1 r7c3} - n9{r7c3 r1c3} - n6{r1c3 r3c1} - {n6 n2}r3c9 - n2{r3c2 r1c2} - {n2 n4}r1c7 - n4{r7c7 r9c8} - n5{r9c8 r5c8} - n5{r5c2 r6c2} - n7{r6c2 r4c1} - {n7 n4}r4c9 -

$n4\{r4c5\ r3c5\} - n9\{r3c5\ r3c4\} - \{n9r7c4\} \implies r6c1 <> 4$
 $nrczt-whip-rn[14] n5\{r2c3\ r2c5\} - n5\{r6c5\ r6c9\} - n5\{r8c9\ r8c4\} - n5\{r9c6\ r5c6\} - n6\{r5c6\ r5c1\}$
 $- n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n4\{r5c9\ r5c4\} - n4\{r6c5\ r6c3\} - n1\{r6c3\ r8c3\} - \{n1\ n8\}r8c5 -$
 $n8\{r6c5\ r4c6\} - n8\{r4c1\ r6c1\} - \{n3r6c1\} \implies r4c3 <> 5$
 $nrczt-whip-bn[17] n9\{r7c4\ r7c3\} - n9\{r1c3\ r1c9\} - n9\{r2c9\ r2c1\} - n9\{r9c1\ r9c5\} -$
 $n2\{r9c5\ r7c5\} - n6\{r7c5\ r4c5\} - n6\{r5c6\ r5c1\} - n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - \{n3$
 $n7\}r2c9 - n7\{r3c8\ r7c8\} - \{n7\ n8\}r7c4 - \{n8\ n3\}r7c2 - \{n3\ n1\}r8c3 - \{n1\ n5\}r8c5 -$
 $n5\{r2c5\ r2c3\} - \{n3r2c3\} \implies r3c4 <> 9$
 $nrczt-whip-rn[18] n2\{r9c5\ r7c5\} - n2\{r7c7\ r8c9\} - \{n2\ n6\}r9c7 - n6\{r9c5\ r4c5\} -$
 $n6\{r4c3\ r1c3\} - \{n6\ n9\}r1c9 - n9\{r2c9\ r2c1\} - \{n9\ n2\}r3c1 - n6\{r3c1\ r5c1\} - n2\{r5c1$
 $r5c3\} - n3\{r5c3\ r5c9\} - \{n3\ n7\}r2c9 - n7\{r3c8\ r7c8\} - \{n7\ n3\}r8c7 - n3\{r2c7\ r2c3\} -$
 $n5\{r2c3\ r2c5\} - n5\{r8c5\ r8c4\} - \{n7r8c4\} \implies r9c2 <> 2$
 $nrczt-whip-rc[7] \{n3\ n1\}r9c2 - \{n1\ n2\}r8c3 - \{n2\ n8\}r7c2 - \{n8\ n5\}r5c2 - n5\{r5c8\ r9c8\} - \{n5$
 $n7\}r8c9 - \{n7r8c7\} \implies r8c1 <> 3$
 $nrczt-whip-rn[7] n5\{r9c8\ r5c8\} - n5\{r6c9\ r8c9\} - n3\{r8c9\ r8c3\} - \{n3\ n1\}r9c2 - \{n1\ n8\}r5c2 -$
 $n8\{r7c2\ r8c1\} - \{n2r8c1\} \implies r9c8 <> 3$
 $nrczt-whip-rc[10] n2\{r9c5\ r9c7\} - n6\{r9c7\ r9c6\} - n6\{r5c6\ r5c1\} - n2\{r5c1\ r5c3\} - n2\{r8c3\ r8c1\}$
 $- n8\{r8c1\ r7c2\} - \{n8\ n7\}r7c6 - \{n7\ n9\}r7c4 - n9\{r9c5\ r9c1\} - \{n9r3c1\} \implies r9c5 <> 3$
 $nrczt-whip-cn[10] n3\{r9c2\ r9c6\} - n3\{r7c6\ r7c8\} - n3\{r7c5\ r3c5\} - n9\{r3c5\ r3c1\} - \{n9\ n4\}r9c1 -$
 $n4\{r9c8\ r7c7\} - n6\{r7c7\ r9c7\} - n2\{r9c7\ r8c9\} - n2\{r8c3\ r5c3\} - \{n2r5c1\} \implies r1c2 <> 3$
 $nrczt-whip-rn[11] n2\{r9c5\ r7c5\} - n6\{r7c5\ r4c5\} - n6\{r5c6\ r5c1\} - n2\{r5c1\ r5c3\} - n2\{r8c3\ r8c1\}$
 $- \{n2\ n9\}r3c1 - n9\{r3c5\ r1c5\} - n3\{r1c5\ r3c5\} - n4\{r3c5\ r6c5\} - \{n3\ n4\}r5c9 - \{n3r5c9\} \implies$
 $r9c5 <> 1$
 $nrczt-whip-bn[13] n3\{r9c6\ r9c2\} - n1\{r9c2\ r9c4\} - \{n1\ n8\}r8c5 - n5\{r8c5\ r8c9\} - n5\{r4c9\ r4c5\} -$
 $n5\{r5c4\ r1c4\} - n9\{r1c4\ r7c4\} - n9\{r7c3\ r1c3\} - n6\{r1c3\ r1c9\} - \{n6\ n2\}r3c9 - \{n2\ n7\}r3c2 -$
 $n7\{r3c6\ r1c6\} - \{n8r1c6\} \implies r9c6 <> 5$
 $nrczt-whip-rc[11] \{n1\ n3\}r9c2 - \{n3\ n6\}r9c6 - n6\{r5c6\ r5c1\} - n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} -$
 $n4\{r5c9\ r5c4\} - \{n4\ n7\}r3c4 - n7\{r8c4\ r7c6\} - n3\{r7c6\ r7c5\} - n2\{r9c7\ r9c5\} - \{n2r9c7\} \implies$
 $r9c4 <> 1$
 $hidden-pairs-in-a-row \{n1\ n3\}r9\{c2\ c6\} \implies r9c6 <> 6, r9c5 <> 9$
 $interaction\ column\ c5\ with\ block\ b2\ for\ number\ 9 \implies r1c4 <> 9$
 $nrczt-whip-cn[9] n9\{r3c5\ r1c5\} - n3\{r1c5\ r7c5\} - n2\{r7c5\ r9c5\} - n6\{r9c5\ r4c5\} - n6\{r5c6\ r5c1\}$
 $- n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n4\{r5c9\ r5c4\} - \{n4r6c5\} \implies r3c5 <> 1$
 $nrczt-whip-cn[9] n9\{r1c5\ r3c5\} - n3\{r3c5\ r7c5\} - n2\{r7c5\ r9c5\} - n6\{r9c5\ r4c5\} - n6\{r5c6\ r5c1\}$
 $- n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n4\{r5c9\ r5c4\} - \{n4r6c5\} \implies r1c5 <> 8$
 $nrczt-whip-rn[9] n9\{r1c5\ r3c5\} - n3\{r3c5\ r7c5\} - n2\{r7c5\ r9c5\} - n6\{r9c5\ r4c5\} - n6\{r4c3\ r1c3\} -$
 $\{n6\ n2\}r3c1 - \{n2\ n7\}r1c2 - \{n7\ n3\}r3c2 - \{n3r9c2\} \implies r1c5 <> 5$
 $nrczt-whip-cn[12] n2\{r5c1\ r5c3\} - n4\{r5c3\ r7c3\} - n4\{r7c7\ r1c7\} - n4\{r1c4\ r3c4\} - n4\{r3c8\ r9c8\}$
 $- n5\{r9c8\ r5c8\} - n5\{r6c9\ r8c9\} - n2\{r8c9\ r8c1\} - n8\{r8c1\ r7c2\} - \{n8\ n1\}r5c2 - n1\{r9c2\ r8c3\} -$
 $\{n1r8c4\} \implies r5c1 <> 4$
 $nrczt-whip-rc[10] n7\{r6c2\ r4c1\} - n4\{r4c1\ r9c1\} - n9\{r9c1\ r7c3\} - \{n9\ n6\}r1c3 - n6\{r4c3\ r5c1\} -$
 $n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n4\{r5c9\ r4c9\} - n5\{r4c9\ r8c9\} - \{n5r9c8\} \implies r6c9 <> 7$
 $nrczt-whip-bn[12] \{n3\ n7\}r8c7 - n7\{r4c7\ r4c9\} - \{n7\ n9\}r2c9 - \{n9\ n7\}r2c1 - n3\{r2c1\ r3c2\} -$
 $\{n3\ n5\}r2c3 - \{n5\ n2\}r1c2 - n7\{r1c2\ r6c2\} - n5\{r6c2\ r5c2\} - n5\{r5c9\ r6c9\} - n4\{r6c9\ r5c9\} -$
 $\{n3r5c9\} \implies r2c7 <> 3$
 $nrct-chain[6] n6\{r5c6\ r5c1\} - n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n3\{r6c7\ r8c7\} - \{n3\ n1\}r8c3 -$
 $n1\{r9c2\ r9c6\} \implies r5c6 <> 1$
 $nrczt-whip-rn[9] n9\{r2c9\ r2c1\} - n3\{r2c1\ r2c3\} - n5\{r2c3\ r2c5\} - n5\{r1c6\ r1c2\} - n7\{r1c2\ r3c2\} -$
 $n7\{r3c8\ r7c8\} - n7\{r8c9\ r8c4\} - n5\{r8c4\ r9c4\} - \{n9r9c4\} \implies r2c9 <> 7$
 $nrct-chain[7] \{n4\ n2\}r1c7 - \{n2\ n6\}r3c9 - \{n6\ n9\}r1c9 - \{n9\ n3\}r2c9 - n3\{r3c8\ r7c8\} - n3\{r7c6$
 $r9c6\} - n3\{r1c6\ r1c5\} \implies r1c5 <> 4$
 $nrczt-whip-cn[8] n2\{r5c3\ r5c1\} - n3\{r5c1\ r5c9\} - n4\{r5c9\ r5c4\} - n4\{r1c4\ r3c5\} - n9\{r3c5\ r1c5\}$
 $- n3\{r1c5\ r7c5\} - \{n3\ n1\}r9c6 - \{n1r9c2\} \implies r5c3 <> 1$
 $nrct-chain[9] n6\{r5c6\ r5c1\} - n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n4\{r5c9\ r5c4\} - n4\{r1c4\ r3c5\} -$
 $n9\{r3c5\ r1c5\} - n3\{r1c5\ r7c5\} - n2\{r7c5\ r9c5\} - n6\{r9c5\ r4c5\} \implies r4c6 <> 6$
 $nrczt-whip-rn[9] n2\{r5c1\ r5c3\} - n3\{r5c3\ r5c9\} - n4\{r5c9\ r5c4\} - n4\{r1c4\ r3c5\} - n9\{r3c5\ r1c5\} -$
 $n3\{r1c5\ r7c5\} - n2\{r7c5\ r9c5\} - n6\{r9c5\ r4c5\} - \{n6r5c6\} \implies r5c1 <> 8$
 $nrczt-whip-rc[10] n6\{r5c6\ r4c5\} - \{n6\ n2\}r9c5 - \{n2\ n3\}r7c5 - \{n3\ n1\}r9c6 - n1\{r9c2\ r8c3\} -$
 $n1\{r4c3\ r4c7\} - \{n1\ n5\}r5c8 - \{n5\ n4\}r9c8 - n4\{r9c1\ r7c3\} - \{n4r4c3\} \implies r5c6 <> 8$

nrczt-whip-rc[8] n4{r4c1 r9c1} - n9{r9c1 r7c3} - {n9 n6}r1c3 - n6{r4c3 r5c1} - {n6 n5}r5c6 - {n5 n1}r4c6 - n1{r9c6 r9c2} - {n1r5c2 .} ==> r4c1 <> 8

nrczt-whip-cn[11] n7{r2c8 r2c1} - n9{r2c1 r2c9} - n3{r2c9 r3c8} - {n3 n4}r7c8 - n4{r9c8 r9c1} - {n4 n6}r4c1 - n6{r4c3 r1c3} - n9{r1c3 r1c5} - n3{r1c5 r7c5} - {n2 n6}r9c5 - {n2r9c5 .} ==> r1c8 <> 7

nrczt-whip-rn[10] n3{r9c6 r9c2} - n1{r9c2 r9c6} - {n1 n7}r3c6 - {n7 n2}r3c2 - {n2 n8}r7c2 - n8{r7c6 r4c6} - n8{r5c4 r5c8} - n8{r1c8 r1c4} - n5{r1c4 r1c2} - {n7r1c2 .} ==> r1c6 <> 3

nrczt-whip-rn[11] n5{r9c8 r9c4} - n9{r9c4 r9c1} - n9{r3c1 r3c5} - {n9 n3}r1c5 - {n3 n8}r1c8 - n4{r1c8 r1c7} - {n4 n7}r1c4 - n7{r8c4 r7c6} - {n7 n3}r7c8 - {n9 n3}r2c9 - {n9r2c9 .} ==> r9c8 <> 4

naked and hidden singles ==> r9c8 = 5, r9c4 = 9, r9c1 = 4, r7c3 = 9, r1c3 = 6, r3c9 = 6

interaction row r3 with block b1 for number 2 ==> r1c2 <> 2

nrc-chain[3] n3{r1c8 r1c5} - n9{r1c5 r1c9} - {n9 n3}r2c9 ==> r3c8 <> 3

xyt-chain[4] {n7 n5}r1c2 - {n5 n3}r2c3 - {n3 n9}r2c9 - {n9 n7}r2c1 ==> r3c2 <> 7

nrc-chain[5] n3{r7c8 r1c8} - {n3 n9}r1c5 - {n9 n2}r1c9 - {n2 n4}r1c7 - n4{r7c7 r7c8} ==> r7c8 <> 7

interaction column c8 with block b3 for number 7 ==> r2c7 <> 7

interaction row r7 with block b8 for number 7 ==> r8c4 <> 7

nrczt-whip-bn[6] n7{r6c2 r1c2} - n5{r1c2 r5c2} - {n5 n6}r5c6 - n6{r5c1 r4c1} - n7{r4c1 r6c1} - {n8r6c1 .} ==> r6c2 <> 1

nrczt-whip-rn[5] n8{r4c5 r4c7} - {n8 n1}r2c7 - {n1 n5}r2c5 - n5{r2c3 r6c3} - {n1r6c3 .} ==> r6c5 <> 8

nrct-chain[6] {n3 n1}r9c6 - n1{r9c2 r5c2} - n1{r5c4 r3c4} - n1{r3c8 r2c8} - n7{r2c8 r3c8} - {n7 n3}r3c6 ==> r7c6 <> 3

nrct-chain[7] n3{r9c6 r7c5} - n2{r7c5 r9c5} - n6{r9c5 r7c6} - n6{r5c6 r5c1} - {n6 n7}r4c1 - n7{r6c2 r1c2} - n7{r1c6 r3c6} ==> r3c6 <> 3

naked and hidden singles ==> r9c6 = 3, r9c2 = 1

naked-pairs-in-a-block {n2 n6}{r7c5 r9c5} ==> r7c6 <> 6

hidden-singles ==> r5c6 = 6, r4c1 = 6

interaction row r4 with block b6 for number 7 ==> r6c7 <> 7

naked-pairs-in-a-block {n7 n8}{r7c4 r7c6} ==> r8c5 <> 8, r8c4 <> 8

hidden-single-in-a-row ==> r8c1 = 8

hidden-pairs-in-a-column {n3 n9}{r1 r3}c5 ==> r3c5 <> 4

interaction column c5 with block b5 for number 4 ==> r5c4 <> 4

nrc-chain[2] n1{r3c6 r4c6} - n1{r5c4 r5c8} ==> r3c8 <> 1

interaction row r3 with block b2 for number 1 ==> r2c5 <> 1

naked-triplets-in-a-row {n8 n5 n1}r5{c2 c4 c8} ==> r5c9 <> 5

nrc-chain[2] n5{r1c6 r4c6} - n5{r5c4 r5c2} ==> r1c2 <> 5

naked and hidden singles

GRID 5287 SOLVED. LEVEL = NRCZT21, MOST COMPLEX RULE = NRCZT21

176435289
945682173
238197546
694351827
352876914
781249365
529768431
863514792
417923658

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ronk

Posted: Wed Sep 30, 2009 12:59 pm Post subject: Re: nrct- and nrczt- lassos



nearly 2 years ago, here denis_berthier wrote:

Once we have built a partial nrct- or nrczt- chain, it is normally ended on the right when its last right-linking candidate can be nrc-linked to a target.

...

The first case is when there is already somewhere in the partial chain a left-linking candidate C that might be taken as a right-linking candidate of a later part of the chain if

Joined: 02 Nov 2005
Posts: 2653
Location: Southeastern USA

we had not excluded loops. In this case, the target of the partial chain can be eliminated (for the same reason as usual: this situation leads to a contradiction).

Where is your definition of **partial chain** ?

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denis_berthier

Posted: Wed Sep 30, 2009 1:03 pm Post subject: Re: nrct- and nrczt-lassos



Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

ronk wrote:

nearly 2 years ago, [here denis_berthier wrote:](#)

Once we have built a partial nrct- or nrczt- chain, it is normally ended on the right when its last right-linking candidate can be nrc-linked to a target.
...

Where is your definition of **partial chain** ?

Partial is to be understood in the common sense of not yet completed: i.e. the last right-linking candidate can't be linked to the target.

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PIsacson

Posted: Wed Oct 21, 2009 10:43 am Post subject:



Joined: 02 Jul 2008
Posts: 344
Location: Campbell, CA

Denis,

I hope this is the right thread for these questions. It's a follow-up to Red Ed's interest in using my C++ version of nrczt chains for scoring puzzles.

Does SudoRules/CLIPS follow any specific method of choosing which z-target to use when generating various length nrczt chains/whips? I have the feeling that it is conceptually done in parallel and that you don't specify any particular order.

Are whips a separate rule, or just an modification of an existing one. Reason I ask is because from what I recall of the CLIPS engine, it applies rules in priority sequence, so it kind of makes a difference.

I've briefly looked at CLIPS and I'm thinking that some or most of the answers are in the documentation on how it works, plus I have your book for general reference on the actual rule names etc.

Cheers,
Paul

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denis_berthier

Posted: Wed Oct 21, 2009 12:30 pm Post subject:



Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

PIsacson wrote:

Does SudoRules/CLIPS follow any specific method of choosing which z-target to use when generating various length nrczt chains/whips? I have the feeling that it is conceptually done in parallel and that you don't specify any particular order.

You're right. Conceptually, everything is done in parallel. The algorithm is:

- 1) Loop until quiescence
 - 1a) n=0. Apply all the rules for elementary constraints propagation and singles until quiescence
 - 1b) n=1. Apply one row-block or column-block interaction - which I have proven to be equivalent to whips[1]; if none can be applied, GOTO 2

end loop
 2) $n=n+1$
 2a) build all the partial nrczt-whips[n] by extending the partial nrczt-whips[n-1],
 2b) if there is at least one complete nrczt-whip[n], choose one randomly, fire the rule for z elimination and GOTO 1,
 2c) if there is no nrczt-whip[n], GOTO 2

I could make SudoRules much (maybe thousand times) faster if I only wanted any whip solution, with no constraint on length - but I'm not interested.

The difficulty is having a solution with the shortest whips. But this is what rating is all about. Considering the rating purpose inherent in SudoRules, I don't think you could get something much faster than SudoRules if you decided to use Clips or Jess for the same purpose.

I thought you were using C because you could have a finer manual control on memory, design of structures and algorithm.

Now, if you program it the way described above, it will be awfully slow. You must clearly retain something from the previous loop. What and how? This is where my experience with procedural languages is too limited to be of any help.

PIsaacson wrote:

Are whips a separate rule, or just an modification of an existing one. Reason I ask is because from what I recall of the CLIPS engine, it applies rules in priority sequence, so it kind of makes a difference.

There is one whip[n] rule for any length n.
 Whip[n] has higher salience than whip[n+1]. But priority (salience), if used alone, is a poor way of imposing an ordering on rule firing.

Last edited by denis_berthier on Sat Oct 24, 2009 7:33 am; edited 1 time in total

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PIsaacson

Posted: Wed Oct 21, 2009 1:37 pm Post subject:



Denis,

Joined: 02 Jul 2008
 Posts: 344
 Location: Campbell, CA

Thanks for the info, that really helps. I was treating all singles + constraints + box/line interactions as level 0, so I never saw any scores of 1. Now I know why... Duuuhhh...

Good news is that my algorithm is almost identical to yours, only big difference being the use of BFS and no need to save partials:

- 1) $n=0$, $\max(n)=0$
 - 1a) execute all singles + constraints + box/line interactions
 - 1b) if puzzle is solved goto 3
 - 1c) if there are any eliminations goto 1a
- 2) $n=2$, $\max(n)=\max$ of (n $\max(n)$), build nrc adjacency matrix
 - 2a) execute BFS limited to depth n for all z-targets in nrc order
 - 2b) if puzzle is solved goto 3
 - 2c) if there are any eliminations goto 1a
 - 2d) $n=n+1$, $\max(n) = \max$ of (n $\max(n)$), goto 2a
- 3) nrczt level = $\max(n)$

By incrementally stepping the max allowed depth for BFS, I obviously re-discover many non-productive chains. But BFS is so fast that even with the additional scanning, the royle17 36628 collection still only takes 1 minute to process. I really trimmed it to the minimum so there's nothing left of the ALS+ group code or the pseudo-braids code. I still have lots of comparisons to do to

confirm that I'm in the ball-park. I've been up all night working on this, so I better sleep before I do something stupid, like accidentally delete all my changed code...

Cheers,
Paul

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denis_berthier

Posted: Wed Oct 21, 2009 6:26 pm Post subject:



Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Paul,

I don't know what your "nrc adjacency matrix" is, but if it contains anything else than direct nrc links (i.e. candidates seeing each other), the algorithm is totally different and you underrate the length.

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PIsaacson

Posted: Wed Oct 21, 2009 6:47 pm Post subject:



Joined: 02 Jul 2008
Posts: 344
Location: Campbell, CA

Denis,

The adjacency matrix contains all the parent child nrc relationships. Normally, I would include group generated relationships and treat them as nrc except for skipping zt processing. But with the elimination of group logic for this prototype, only standard line-of-sight peers are stored and utilized by the BFS routine.

Cheers,
Paul

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denis_berthier

Posted: Wed Oct 21, 2009 7:41 pm Post subject:



Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

OK for this particular case, but of course not OK for the case with groups.

one more point: what is BFS limited to depth n? Does it mean that you make at most n successive hypotheses (as standard BFS) or that you apply at most n singles rules ?

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PIsaacson

Posted: Wed Oct 21, 2009 8:08 pm Post subject:



Joined: 02 Jul 2008
Posts: 344
Location: Campbell, CA

I'm using the term depth within BFS to restrict how many levels of parent-child relationships to descend while generating a tree from any given z-target. This equates exactly to the number of conjugate pairs {lh rh} entries present in the chain. As a subtle point, each level within the queue contains either a lh or a rh candidate and not a pair, so in fact depth = level / 2. All even levels are truths (starting with level 0 as the z-target) and all odd levels are false-hoods.

Hope this answers the question, 'cause I'm not sure what the difference would be between n successive hypotheses or n single(s) rules. Per se, there are no rules in BFS other than those imposed by the strong/weak link logic turns, so I'm lost without further explanation.

Good news is that I just ran the sudogen0 10k set and compared our nrczt ratings and (only?) had 2063 differences. I only scored 1 higher than you: puzzle 6972 which I scored 7 and you had posted as 6. For all the other 2062 differences I'm lower by 1, other than 90 cases in which I'm lower by 2. Is this because of whips? I'm hoping your sudogen0-pNRCZT-1-10000.txt is pre-whips even though my copy is dated Sep 18, 2008. Do you have any other collections with whips that I could compare to???

Cheers,
Paul

Paul

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Posted: Wed Oct 21, 2009 11:28 pm Post subject:



Joined: 02 Jul 2008

Posts: 344

Location: Campbell, CA

Denis,

Whoops again... It's not whips, it's locked sets. I accidentally left in code that processes locked sets so it finds naked/hidden pairs/triples/quads and doesn't report them as any increase beyond box/line interactions.

While I have you on the phone, so to speak, in matching other nrczt ratings from your web site, I see the value 0.9 appearing. I'm assuming I should use that as the minimum score instead of 0.

[edit - 18:26 PST] I downloaded all the nrczt collections and ratings that I could locate from your site -- some problem with the initial sudogen0_1m link, but I'm following the instructions to re-gen it using suexg. Upon running and comparing the rabrnd_1m, suexg14-0_1m and the mike#5 collections, it looks like I'm consistently scoring low by 1 point for about 12% of the puzzles, even after correcting the locked sets bug. The different scores are all over the place, so it's not a case of something happening in just some band. The number that I score higher is extremely low, less than a handful for each collection and by a single point. Likewise, there are some lower scores that deviate by 2 whole points, and while they are not common, that disturbs me more.

Without comparing actual solution logs from SudoRules to my nrczt engine, I'm not sure how else to resolve this. Any ideas/suggestions???

Cheers,

Paul

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Posted: Thu Oct 22, 2009 6:19 am Post subject:



Joined: 19 Jun 2007

Posts: 1085

Location: Paris, France

Pisaacson wrote:

I'm using the term depth within BFS to restrict how many levels of parent-child relationships to descend while generating a tree from any given z-target. This equates exactly to the number of conjugate pairs {lh rh} entries present in the chain. As a subtle point, each level within the queue contains either a lh or a rh candidate and not a pair, so in fact depth = level / 2. All even levels are truths (starting with level 0 as the z-target) and all odd levels are false-hoods.

OK

Pisaacson wrote:

I'm hoping your sudogen0-pNRCZT-1-10000.txt is pre-whips even though my copy is dated Sep 18, 2008.

All the results on my web pages are with whips.

Pisaacson wrote:

some problem with the initial sudogen0_1m link

fixed

Pisaacson wrote:

I see the value 0.9 appearing. I'm assuming I should use that as the minimum score instead of 0.

Yes, I put 0.9 in order to keep a small difference with 1.
0 would be only constraints propagation, where no unsolved puzzle can be solved.

Pisaacson wrote:

Upon running and comparing the rabrnd_1m, suexg14-0_1m and the mike#5 collections, it looks like I'm consistently scoring low by 1 point for about 12% of the puzzles, even after correcting the locked sets bug. The different scores are all over the place, so it's not a case of something happening in just some band. The number that I score higher is extremely low, less than a handful for each collection and by a single point. Likewise, there are some lower scores that deviate by 2 whole points, and while they are not common, that disturbs me more.

A difference in 12% of the cases indicates a bug. But I have no idea from where it can come.

Pisaacson wrote:

Without comparing actual solution logs from SudoRules to my nrczt engine, I'm not sure how else to resolve this.

There are lots of solution paths in this forum and on my web pages. If you want some for a specific puzzle, tell me.

But I doubt this can help you: there are many different paths at the same level.

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denis_berthier

Posted: Thu Oct 29, 2009 6:29 pm Post subject:



Paul,

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

I had a look at your program and I've been unable to find any structure for representing nrczt-whips or braids.

Well, you know I'm not a C programmer, so I may have missed something subtle in your code. Tell me if I'm wrong about it.

If I'm right on the previous point and considering the bug in the example in your PM, I think I now have a better understanding of what happens.

I told you that in SudoRules, all the chains of length n were built in parallel. In parallel, but in isolation of each other.

It seems to me that the absence of a specific structure for chains doesn't allow you to avoid interferences between all the partial chains for a given target.

This is also the reason for the incorrect length you get for braids: you have no braid structure to record the lengths of the various branches and add them.

Either you've found some really great implicit way of representing isolated chains (which I'm not able to recognise in your code but which I'd like you to explain) or you must introduce structures to explicitly represent whips and braids.

One more point: doing so will probably drastically increase computation time. I don't believe nrczt-rating can be both correct and so fast.

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